ABSTRACT. We prove a spectral theorem for bimodules in the context of graph C*-algebras. A bimodule over a suitable abelian algebra is determined by its spectrum (i.e., its groupoid partial order) iff it is generated by the Cuntz–Krieger partial isometries which it contains iff it is invariant under the gauge automorphisms. We study 1-cocycles on the Cuntz–Krieger groupoid associated with a graph C*-algebra, obtaining results on when integer valued or bounded cocycles on the natural AF subgroupoid extend. To a finite graph with a total order, we associate a nest subalgebra of the graph C*-algebra and then determine its spectrum. This is used to investigate properties of the nest subalgebra. We give a characterization of the partial isometries in a graph C*-algebra which normalize a natural diagonal subalgebra and use this to show that gauge invariant generating triangular subalgebras are classified by their spectra.